

## **TYPHOON ORCHID (23W)**

### **I. HIGHLIGHTS**

Typhoon Orchid (23W) was the first tropical cyclone to develop during the month of October. Orchid's formation coincided with Typhoon Pat's (24W) and, as they matured, they interacted, causing Orchid to slow to 6 kt (11 km/hr) about 200 nm (370 km) off the coast of Japan. This brought prolonged rains and widespread flooding to Tokyo and surrounding cities.

### **II. TRACK AND INTENSITY**

Orchid formed northwest of Guam in a broad monsoon trough that extended from the South China Sea eastward through the Caroline Islands and was included as a suspect area on the 010600Z October Significant Tropical Weather Advisory. A mid-latitude trough weakened the mid-tropospheric subtropical ridge to allow the tropical disturbance to slowly gain latitude. When low-level convergence created by a surge in the monsoon westerlies enhanced convection, forecasters issued a Tropical Cyclone Formation Alert at 030800Z. The first warning followed on Tropical Depression 23W at 040000Z. (Post analysis of satellite derived current intensity estimates indicated tropical storm intensity most probably had been reached 12 hours before the first warning through normal, rather than rapid deepening.) Orchid tracked due westward south of the re-established subtropical ridge and developed into a typhoon. Orchid's intensity peaked at 120 kt (62 m/sec) just before recurvature, as increased low-level convergence in the southern quadrant enhanced convection, and dual outflow channels aloft were present. Recurvature occurred near 130°E as the mid-tropospheric subtropical ridge receded eastward, allowing Orchid to move north and recurve. Typhoon Orchid slowly accelerated after recurvature, but on 10 October it slowed down south of Japan as interaction started with Typhoon Pat (24W) (Figure 3-23-1). Over a 40-hour period from approximately 100600Z - 120000Z, Orchid "stair-stepped" to the north then back to the northeast apparently due to some binary interaction with Typhoon Pat. As Pat recurved to the east of Orchid and accelerated, Orchid started speeding up, following Pat into the westerlies, and slowly weakening. The final warning was issued at 130000Z as Orchid transitioned into an extratropical low pressure system.

### **III. FORECAST PERFORMANCE**

During recurvature, Orchid was expected to make a more gradual, broader turn around the ridge because the steering flow was weak, as evidenced by the slow speed of motion from 4 to 6 kt (7 to 11 km/hr) on 6 to 7 October. Initially, the typhoon was forecast to pass near Okinawa, west of the guidance provided by most of the dynamic aids (Figure 3-23-2). After recurvature, cross-track forecasts were excellent, although the along-track speed errors were large because the expected forecast acceleration did not take place until Pat moved north of Orchid.

### **VI. IMPACT**

Typhoon Orchid spent much of its life over the open ocean, away from land. However, its slow movement south of Japan caused prolonged rains there, and created huge ocean swells, which combined with those from Pat to produce high waves and hazardous surf as far away as Guam on October 12, where the surf claimed 2 lives. On 14 October, landslides, floods, heavy winds, and torrential rains were reported in Tokyo and the surrounding cities. One person died after being swept away by a swollen river, 14 people were injured and wind gusts to 50 kt (26 m/sec) were recorded in

and around Tokyo. Orchid interrupted transportation across the island, produced 96 landslides, flooded over 675 homes, and caused extensive road damage in Japan.

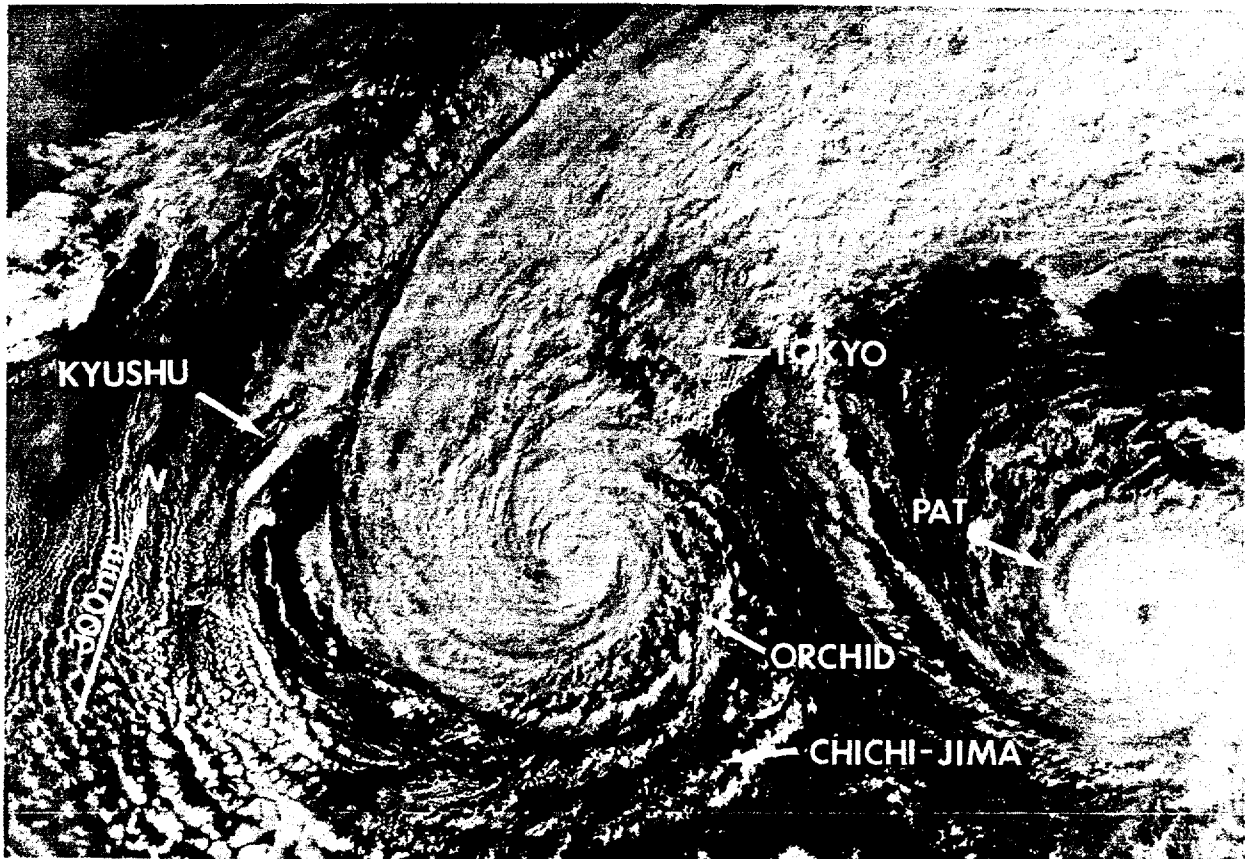


Figure 3-23-1. Typhoon Orchid slowly weakens as it parallels the south coast of Honshu, Japan (112322Z October DMSP visual imagery).

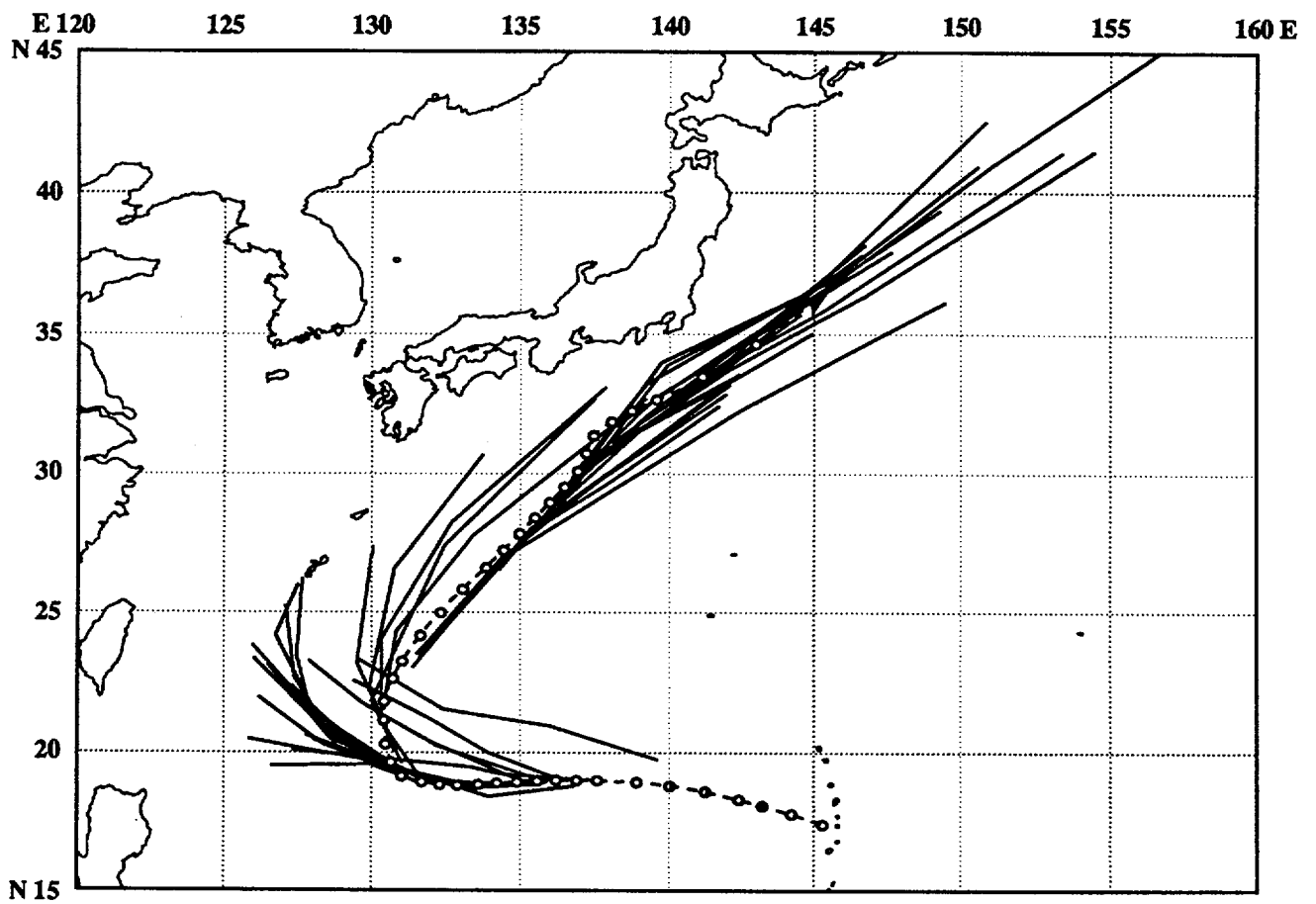


Figure 3-23-2. JTWC forecasts when compared to the final best track show that Orchid turned north sooner than expected.